



## Introduction

Excavation and trenching are among the most hazardous construction operations. The Occupational Safety and Health Administration's (OSHA) Excavation standards, 29 Code of Federal Regulations (CFR) Part 1926, Subpart P, contain requirements for excavation and trenching operations.

## PROTECTIVE SYSTEMS: HOW TO PREVENT CAVE-INS

OSHA generally requires that employers protect workers from cave-ins. Two methods covered in this toolbox talk at sloping and benching the sides of the excavation.

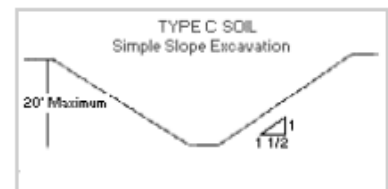
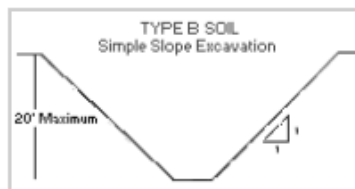
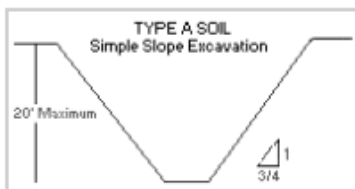
### Sloping

Maximum allowable slopes for excavations less than 20 ft (6.09 m) based on soil type and angle to the horizontal are as follows:

Table V:2-1 Allowable Slopes

Soil Type	Height:Depth Ratio	Slope Angle
Stable Rock	Vertical	90°
Type A	0.75:1	53°
Type B	1:1	45°
Type C	1.5:1	34°
Type A (short term)	0.5:1	63°

(For a maximum excavation depth of 12ft)

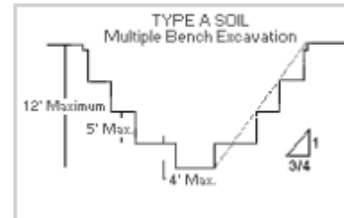
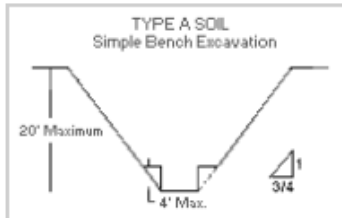


The above figures illustrate the different types of slope excavations for Type A, B, and C soils in single slope excavations.

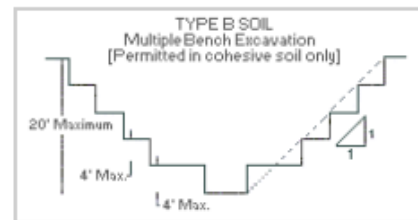
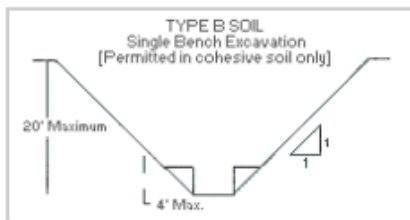
## Benching

There are two basic types of benching, simple and multiple. The type of soil determines the horizontal to vertical ratio of the benched side. As a general rule, the bottom vertical height of the trench must not exceed 4 ft (1.2 m) for the first bench. Subsequent benches may be up to a maximum of 5 ft (1.5 m) vertical in Type A soil and 4 ft (1.2 m) in Type B soil to a total trench depth of 20 ft (6.0 m). All subsequent benches must be below the maximum allowable slope for that soil type. For Type B soil the trench excavation is permitted in cohesive soil only.

The figures below illustrate two types of excavations made in Type A soil: Single Bench Excavation and Multiple Bench Excavation.



The figures below illustrate two types of excavations made in Type B soil that are permitted in cohesive soil only: Single Bench Excavation, and Multiple Bench Excavation.



## Brick Saw

A brick saw (also known as a Stihl saw/cut-off saw) is an extremely useful tool on a restoration site, enabling you to cut reinforcing bar to size or to quickly cut bricks with minimal wastage—but in inexperienced hands, they can be dangerous! There are several general safety considerations to follow when using brick saws:

- Saws must only be used by experienced personnel who have been trained in their use and the changing discs.
- Make sure the correct disc is fitted for the job. Stone and steel discs have different properties.
- Make sure the water system for dust suppression is fitted, filled with water, and is in working order.
- Face shields are mandatory for the user when cutting stone, concrete, or brick.
- Keep other workers and the public out of range of flying debris and dust.
- Take special care not to drop portable grinding tools as the wheel could be damaged and break when in use.
- Never force a grinding machine against the work, as dangerous flat spots could develop on the wheel.

Personal Protective Equipment—Cutting Bricks; Minimum Personal Protective Equipment (PPE) for cutting bricks and concrete are as follows construction boots, ear protection, face shield. Water spray should always be used when cutting bricks as it cuts down on the nuisance of dust for everyone on site.

Personal Protective Equipment—Cutting Metal; Minimum PPE is construction boots, full length trousers, long sleeves, gloves, ear protection, face shield.